PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/811,204
Filing Date:	March 26, 2004
Applicant:	Daryl Chapman
Group Art Unit:	1795
Examiner:	Ben Lewis
Title:	NON-FLAMMABLE EXHAUST ENABLER FOR HYDROGEN POWERED FUEL CELLS
Attorney Docket:	GP-302076

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APPELLANT'S SECOND APPEAL BRIEF

This is Appellant's Second Appeal Brief filed in response to the Office Action mailed March 4, 2009 pursuant to the decision to reopen prosecution.

Appellant's first Notice of Appeal was filed in the USPTO on September 26, 2008 with a filing fee of $510 and Appellant's First Appeal Brief was filed in the USPTO on November 26, 2008 with a filing fee of $540. Appellant's second Notice of Appeal, pursuant to 37 CFR §41.31, is being filed concurrently. Appellant believes there is a Notice of Appeal filing fee due in the amount of $30.00 (the difference between the Notice of Appeal filing fee on September 26, 2008 and the date of this filing). Please consider this as authorization to charge deposit account 070961any fees which may be due for the filing of the Notice of Appeal and Appeal Brief pursuant to 37 CFR §41.20(b)(2).

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I. Real Party in Interest

The real party in interest for this appeal is the General Motors Corporation of Detroit, Michigan, the assignee of this application.

II. Related Appeals and Interferences

There are no related appeals or interferences.

III. Status of the Claims

Claims 1, 5, 10 and 31 are pending. Claims 1, 5, 10 and 31 stand rejected. Claims 1, 5, 10 and 31 are on appeal. Claims 2-4, 6-9 and 11-30 have been cancelled. No claims have been objected to. No claim has been withdrawn from consideration. No claim has been allowed.

IV. Status of Amendments

All amendments have been entered.

V. Summary of Claimed Subject Matter

Independent claim 1 claims a fuel cell system, such as fuel cell system 10 shown in figure 1 and discussed beginning at paragraph [0015], page 4, line 22 of the specification. The claimed fuel cell system 10 includes a fuel cell stack 12 receiving a cathode input gas on cathode input line 18 and an anode input gas on anode input line 16. Paragraph [0015], page 4, line 22. The fuel cell stack 12 outputs a cathode exhaust gas on cathode exhaust gas line 22 and an anode exhaust gas on anode exhaust gas line 20. Paragraph [0015], page 4, line 22. The fuel cell system 10 also includes a purge valve 28 in the anode exhaust gas line 20 for selectively purging the anode exhaust gas. Paragraph [0017], page 5, lines 20-22. The fuel cell system 10 also

includes an accumulator 26 coupled to the anode exhaust gas line 20 that accumulates the purged anode exhaust gas from the purge valve 28. Paragraph [0017], page 5, lines 20-22. In addition, the fuel cell system 10 includes a bleed valve 30 for selectively bleeding the anode exhaust gas accumulated in the accumulator 26 where the bled anode exhaust gas from the bleed valve 30 is combined with the cathode exhaust gas in the cathode exhaust gas line 22 at a mixer 32. Paragraph [0021], page 6, lines 29-31.

The bleed valve 30 can be at least one fixed orifice that allows the anode exhaust gas to be bled from the accumulator 26 in a continuous manner where the rate that the anode exhaust gas is bled from the accumulator 26 is less than the rate that the anode exhaust gas is purged into the accumulator 26 through the purge valve 28. Paragraph [0026], page 6, lines 12-28. By using the accumulator 26 and the bleed valve 30, the amount of hydrogen in the anode exhaust gas that is eventually bled to the environment can be maintained below the combustible level of hydrogen that otherwise may not occur by using the purge valve 28 alone. Paragraph 16, page 5, lines 5-14.

VI. Grounds of Rejection to be Reviewed on Appeal

Whether claim 1 should be rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement;

Whether claims 1 and 5 should be rejected 35 US §103(a) as being unpatentable over JP 11-191422 to Hamada et al. (hereinafter Hamada) in view of U.S. Patent No. 6,406,805 issued to James et al. (hereinafter James) and U.S. Patent No. 6,003,363 issued to Danielson et al. (hereinafter Danielson); and

Whether claim 10 should be rejected under 35 USC 103(a) as being unpatentable over Hamada, James, Danielson and U.S. Patent No. 5,785,298 issued to Kumar (hereinafter Kumar).

VII. Argument

A. Claim 1 complies with the written description requirement

MPEP 2163.02 states, "[A]n objective standard for determining compliance with the written description requirement is, 'does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed'." Further, "[U]nder *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991), to satisfy the written description requirement, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention, and that the invention, in that context, is whatever is now claimed."

As discussed in least paragraph [0017] of the specification, the system 10 employs the accumulator 26 to safely bleed the anode exhaust gas from the fuel cell stack 12 to non-combustible levels. In addition, paragraph [0016] talks about purging the anode exhaust gas from the stack 12 at a rate that is greater than the combustion level of hydrogen in the anode exhaust gas, i.e., at a concentration level of hydrogen where it could ignite. Particularly, paragraph [0016] states, "[T]he anode exhaust gas includes a significant amount of hydrogen..." and paragraph [0017] states, "[T]he system 10 employs a technique for safely bleeding the anode exhaust gas from the fuel cell stack 12 without the need for employing a combustor." Thus, it is clear from Appellant's specification that at least some anode purge hydrogen levels in the anode exhaust gas exiting through the purge valve 28 into the accumulator 26 are above the combustible level of hydrogen. Otherwise, the use of the accumulator 26 as described would be superfluous.

Paragraph [0020] of the specification talks about the bleed valve 30 being a fixed orifice or orifices where the amount of the anode exhaust gas bled through the orifice

from the accumulator 26 is continuous, but minimal. Paragraph [0020] further states various parameters of the system will determine the type and operation of the bleed valve 30, where the parameters are largely determined by how often it is necessary to purge the fuel cell stack 12. For vehicle applications, the purge rate of the fuel cell stack 12 will be determined by the power demands on the stack 12, as is also described in paragraph [0020].

Thus, paragraph [0016] talks about the purge rate of the anode exhaust gas through the purge valve 28 as at least sometimes being above the combustible level of hydrogen and paragraph [0020] talks about the purge rate of the anode exhaust gas through the bleed valve 30 when it is a fixed orifice from the accumulator 26 as being below the combustible level of the hydrogen. Appellant respectfully submits that one of ordinary skill in the art would readily recognize that Appellant invented and had in their possession as of the filing date of the application a fixed orifice bleed valve that bled anode exhaust gas from an accumulator in a continuous manner at a rate that was less than the rate that an anode exhaust gas was purged into the accumulator through a purge valve.

B. Claims 1 and 5 are not obvious in view of Hamada, James and Danielson

1. Hamada

Hamada discloses a fuel cell system including a fuel cell main body 10. A gas exhausting pipe allows anode exhaust gas from the fuel cell main body 10 to be sent to a main tank 54. A gas exhausting pipe 76 is connected to the tank 54 and to a mixer 78 through needle valves 80 and 82. Paragraph [0021]. Furthermore, paragraph [0021] states that the needle valves 80 and 82 are electromagnetic valves.

2. James

James discloses a method for storing a purged anode gas from a fuel cell system 10. The fuel cell system 10 includes a three-way valve 26 that is controlled by a controller 24 for purging an anode exhaust gas from a fuel cell to a water removal device 28 and then to a hydrogen storage container 30. A vent valve 34 is controlled by the controller 24 to purge the anode gas from the container 30.

3. Danielson

Danielson discloses a system and method for an improved bubble leak tester. Abstract. The bubble leak tester is used to test for leaks in a test part having a test volume 10 by comparing the pressure in the test volume 12 across a bubble chamber 14 having a quantity of liquid, such as water, therein. Column 4, lines 1-5.

4. Discussion

Independent claim 1 states that the bleed valve is at least one fixed orifice that continuously bleeds the anode exhaust gas from the accumulator at a slower rate than the purge valve purges the anode exhaust gas into the accumulator. Support for this can be found in the specification in at least paragraph [0019] where it states that the contents of the accumulator 26 can be slowly removed through the bleed valve 30 before the next purge cycle, and paragraph [0020] where it states that the bleed valve 30 can be a fixed orifice where the amount of the anode exhaust gas bled through the orifice is continuous.

Appellant respectfully submits that the needle valves 80 and 82 of Hamada are electromagnetically controlled valves for selectively controlling the flow of the gas from the tank 54 to the mixer 78, and are not fixed orifices that continuously allow a gas flow from the tank 54 to the mixer 78. In addition, Appellant further submits that Danielson teaches a valve 100 that is manually preset by a manufacturer to allow a predetermined

rate of fluid flow through a vent line 86 for the purpose of performing a leak test. Danielson also teaches an alternate valve arrangement utilizing the valve 100 as a needle valve that is simpler in design and requires fewer valves than the first embodiment. See column 15, lines 12-24. Thus, Appellant respectfully submits that these references do not teach Appellant's invention as claimed, not even with the benefit of hindsight.

As stated in MPEP 2142, "The key to supporting any rejection under 35 USC 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." MPEP 2143.01 in quoting *In re Kahn*, 441 F.3d 977, 786, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006), states, "Obviousness can be established by combining or modifying the teaching of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so." However, MPEP 2143.01 quoting *KSR International Co. v. Teleflex Inc.*, 550 U.S. ____, ____, 82 USPQ2d 1385, 1396 (2007), also states, "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art."

As discussed in paragraph [0020] of the specification, providing a fixed orifice valve may provide better results for a certain type of fuel cell system over a bleed valve that is selectively opened and closed. Appellant respectfully submits that because neither James nor Hamada teach or suggest the use of a fixed orifice valve as claimed by Appellant, and because Danielson merely mentions in passing the possibility of using a fixed orifice valve in a system that is considered to be a complicated version of a leak testing device, the combination of these three references cannot make independent claim 1 obvious.

5. Dependent Claim 31

Dependent claim 31 claims that the at least one fixed orifice is a plurality of fixed orifices. As argued *supra,* the combination of Hamada, James and Danielson fail to teach or suggest a fuel cell system with a bleed valve that is a fixed orifice so as to allow anode exhaust gas to be bled from the accumulator in a continuous manner were the rate that the anode exhaust gas is bled from the accumulator is less than the rate that the anode exhaust gas is purged into the accumulator through the purge valve. Accordingly, dependent claim 31 cannot be obvious as claimed.

C. Claim 10 is not obvious in view of James, Hamada, Danielson and Kumar

1. Kumar

Kumar discloses a proportional solenoid-driven valve control assembly. Abstract. The assembly includes a valve unit 10 of non-magnetic material, such as stainless steel, and a solenoid unit 20, comprised of magnetic material such as magnetic steel, which is mechanically coupled with valve unit 10 for electrically controlling its operations and hence the flow of fluid between a fluid input port 101 and a fluid exit port 103.

2. Discussion

Dependent claim 10 claims that the purge valve is a spring-biased, solenoid controlled valve. It is believed that the Examiner is relying on Kumar to teach solenoid valves. However, Kumar fails to teach a bleed valve which is a fixed orifice valve and not a solenoid-control valve. Thus, Kumar fails to provide the teaching missing from Hamada, James and Danielson. Accordingly, Appellant respectfully submits that Kumar does not render Appellant's claimed invention obvious.

VIII. Conclusion

Appellant respectfully submits that claims 1, 5, 10 and 31 are not obvious in view of the combination of James, Hamada and Kumar and that claim 1 complies with the written description requirement. It is therefore respectfully requested that the §112 and §103(a) rejections be reversed, and Appellants claims be allowed.

Respectfully submitted,

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CLAIMS APPENDIX

COPY OF CLAIMS INVOLVED IN THE APPEAL

1. A fuel cell system comprising:

a fuel cell stack, said fuel cell stack receiving a cathode input gas and a hydrogen anode input gas, said fuel cell stack exhausting a cathode exhaust gas on a cathode exhaust gas line and an anode exhaust gas on an anode exhaust gas line;

a purge valve coupled to the anode exhaust gas line for selectively purging the anode exhaust gas;

an accumulator coupled to the anode exhaust gas line, said accumulator accumulating the purged anode exhaust gas from the purge valve; and

a bleed valve for selectively bleeding the anode exhaust gas accumulated in the accumulator, wherein the bled anode exhaust gas from the bleed valve is combined with the cathode exhaust gas in the cathode exhaust gas line, said bleed valve being at least one fixed orifice that allows the anode exhaust gas to be bled from the accumulator in a continuous manner where the rate that the anode exhaust gas is bled from the accumulator is less than the rate that the anode exhaust gas is purged into the accumulator through the purge valve.

5. The system according to claim 1 wherein the combined anode and cathode exhaust gas is exhausted to the environment.

10. The system according to claim 1 wherein the purge valve is a spring-biased, solenoid controlled valve.

31. The system according to claim 1 wherein the at least one fixed orifice is a plurality of fixed orifices.

EVIDENCE APPENDIX

There is no evidence pursuant to §1.130, §1.131 or §1.132.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a court or the Board in any proceeding identified in Section II of this Appeal Brief.